

REMARKS

Careful consideration has been given by the applicant to the Examiner's comments and rejection of the claims, as set forth in the outstanding Office Action, and favorable reconsideration and allowance of the application, as amended, is earnestly solicited.

Applicant notes the Examiner's objections to Claim 11 in view of a typographical error, and applicant has implemented an appropriate amendment in order to obviate this minor ground of objection.

Applicant further notes the Examiner's rejection of Claims 1-3, 5, 9, 12-14, 16 and 20 under 35 U.S.C. §103(a), as being unpatentable over Sojourner, et al., U.S. Patent No. 6,750,939 B2 in view of Lee, U.S. Patent No. 6,844,911 B2, as detailed in the Office Action.

Furthermore, applicant notes the Examiner's rejection of Claims 7, 11, 18 and 22 under 35 U.S.C. §103(a), as being unpatentable over the art, as applied to the previous claims, and further in view of Lovas, et al., U.S. Patent No. 6,126,768; and the rejection of Claims 4, 7, 8, 15, 18 and 19 under 35 U.S.C. §103(a), as being unpatentable over the art applied to the preceding claims and further in view of Liao, et al., U.S. Patent No. 6,681,005 B2. Moreover, Claims 6 and 7 have been rejected as being unpatentable over the art, as previously applied, and further in view of Cohn, U.S. Patent Publication No. 2002/0179921 A1.

Accordingly, in order to clearly and unambiguously distinguish over the art, irrespective as to whether the latter is considered singly or in combination, applicant has amended the claims to more clearly emphasize the distinctions with regard to the invention being directed through novel spacerless filling of liquid crystals cells on silicon backplanes or microdisplays.

Concerning the foregoing, pursuant to the present invention, the spacer walls, which are primarily adapted to provide the spacing between the substrates, and which encompass the liquid crystal displays are closely spaced to each other and the gaps therebetween are filled with a curable sealant so as to avoid the formation of any kind of spacers or gaps subsequent to the curing of the sealant. This enables the formation of the liquid crystal display cells without any distortions or difficulties in providing appropriate optical properties thereto, unlike the prior art, as discussed in the present specification, wherein such distortions in optical properties are difficult to ascertain due to the use of the irregularly placed spacers and balls in the areas containing the liquid crystal displays.

To the contrary, the use of the spacer walls wherein the areas therebetween are fully fillable or filled with the curable sealant avoids the formation of improper or incorrect optical areas in the liquid crystal display locations and cells in a manner which is not at all contemplated in the prior art.

Reverting to the art, as cited by the Examiner, none of the publications, considered singly or in combination are directed or even suggested to the present invention, as set forth in the claims.

Reverting to the primary reference of record, Sojourner, et al., U.S. Patent No. 6,750,939 B2, this publications discloses a method of filling liquid crystal displays (LCDs) through the intermediary of a hole which is drilled or etched through or on the substrates of the display. This has nothing in common with the present invention inasmuch as to the contrary, notwithstanding the comments set forth in the Office Action, Sojourner, et al. fails to either disclose or suggest the spacerless filling of liquid crystals, nor is there any mention

of spacer walls, which has the areas therebetween filled with the curable sealant to enable the spacerless filling of the liquid crystal displays analogous to the present invention.

Although Sojourner, et al. mentions sealant walls, these are the structure or substance, which join the two substrates, but which clearly fail to define any gap between the substrates in those instances. In essence, the concept of the spacers to enable spacerless LCD filling in a manner as set forth in the present application and as claimed herein is not raised in Sojourner, et al. inasmuch as this does not relate to spacers. Furthermore, as illustrated in Figures 3 and 4 of Sojourner, et al., the liquid crystal is filled subsequent to the wafers being joined together, which is completely different from the present method wherein the liquid crystal is dispensed prior to the joining of the wafers.

Consequently, the claims, as presented and amended herein, clearly and unambiguously distinguish over Sojourner, et al., which, in essence, fails to provide any kind of indication as to the spacerless filling of the liquid crystal displays in a manner analogous to that set forth and claimed herein.

Even combining Sojourner, et al. with the secondary references would not lead to the present invention, as claimed herein.

Reverting to Lee, U.S. Patent No. 6,844,911 B2, this discloses a method of laminating two display substrates with multiple display units with the assistance of a subsidiary seal and dummy patterns located outside a unit cell, and which will reduce the breakdown of glass substrates during cutting operations. This has nothing in common with the present application inasmuch as the dummy and subsidiary seal patterns are cut off from the unit cell, and the filling of the liquid crystal is effected subsequent to the lamination of the substrate and the cure of the sealant. Moreover, the curable sealants which are employed in the pattern

provided in the Lee structure, fail to serve as spacer walls. Consequently, both as to method and structure, the present invention as disclosed and claimed clearly distinguishes over Lee.

Lovas, et al., U.S. Patent No. 6,126,768 discloses a method of joining two separate display substrates by applying pressure to the peripheral areas of the display at which the spacer walls are clearly located. However, with regard to Lovas, et al., the substrates are joined with a liquid crystal material inbetween and, in essence, when the LCD cells are empty, pressure is applied and the sealant is cured. Filling is thereby subsequently effected, and the state of emptiness of the LCD cells makes it difficult to obtain a uniform cell gap. Conversely, the present invention, as set forth in the present claims, overcomes this problem by means of the unique spacerless filling of the liquid crystal display cells, and thereby also reduces essential process time in arranging and filling of the basically tiny microdisplays. Lovas, et al. does not in any manner disclose this particular aspect.

With regard to Liao, et al., U.S. Patent No. 6,681,005 B2, the teaching in this patent is similar to that disclosed in Lovas, et al. and is directed to the filling of a liquid crystal cell subsequent to the joining of the substrates. This has nothing in common with the present invention, as set forth in the claims being presented herein for the Examiner's consideration.

Finally, with regard to Cohn, U.S. Patent Publication No. 2002/0179921 A1, this merely relates to a compliant hermetic package having various spacer walls encompassing microdisplays. There is no teaching as to the method and arrangement for providing the spacerless filling of the liquid crystal displays in a manner as described and claimed herein.

Accordingly, in summation, applicant respectfully submits that the claims being presented for the Examiner's consideration herein are clearly directed to allowable subject matter, irrespective as to whether the art is considered singly or in combination, and the early issuance of the Notice of Allowance is earnestly solicited.

However, in the event that the Examiner has any queries concerning the instantly submitted Amendment, applicant's attorney respectfully requests that he be accorded the courtesy of possibly a telephone conference to discuss any matters in need of attention.

Respectfully submitted,


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